ISSN 2786-0183

Helwan International Journal for Nursing Research and Practice

Vol. 4, Issue 11, Month: September 2025, Available at: https://hijnrp.journals.ekb.eg/

The Effect of Smart Phone Addiction on Stress and Sleep Quality of Nursing Students

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Abstract: Addiction to smartphones is among the most common non-substance addictions, and its consequences are pessimistic. Mobile phones are so enticing to teens that some of them rarely turn them off at night. Using a smartphone in a compulsive manner can interfere with daily functioning. Nursing students are the most likely to own a smartphone and use it the most .**Aim :**to identify the effect of smart phone addiction on stress and sleep quality of nursing students. **Design:** A descriptive exploratory design. **Setting**: The faculty of nursing, Helwan University Cairo, Egypt. **Subjects:** A convenient sample of (150) nursing students from different academic years joined the summer courses of the academic year 2023-2024.**tools:** four tools were adopted for data collection including: I students personal data, II smart phone addiction scale (SAS-SV), III Pittsburgh Sleep quality index (PSQI) and IV, DASS -21 scale. **Results:** 72.7% of the studied students had Health problems related to phone use and 56% of them think they are smartphone addicts. Also 65.3% of the studied students had moderate smartphone addiction.72.7% of the studied students had mild stress level while 14% had severe stress level.68% of the studied students had poor sleep quality level. **Conclusion:** there was a statistically considerable direct correlation between smart phone addiction and stress while there is a significant inverse negative correlation between smart phone addiction and sleep quality. Also there is a significant inverse negative correlation between stress and sleep quality. **Recommendations :**Determine the degree of smartphone addiction and how it relates to anxiety and sadness in order to create counseling programs that effectively prevent nursing students from becoming addicted.

Key words: *Addiction, Sleep quality, Smart phone , Stress*

Introduction:

Smartphone use has skyrocketed, becoming a necessary component of many people's everyday lives and bringing about a number of changes in daily routines and behaviors. Among those who use smartphones frequently are nursing students. Students frequently use smartphones to look up study resources, take notes, or find solutions for their assignments. They may be at risk for excessive smartphone use due to their propensity to rely on the device.. **(Brailovskaia etal,2022)**.

Overuse of smartphones can lead to dependence, which is often referred to as "nomophobia," or the unreasonable fear of being without a mobile device. Obsessive use of a smartphone, frequent checking of messages or updates, tolerance for lengthy and intensive use, withdrawal, anxiety or distress, functional impairment, or

ISSN 2786-0183

Helwan International Journal for Nursing Research and Practice

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interference with other life activities and social interactions are all signs of smartphone addiction.(**Ejaz etal,2023).**

Addiction to smartphones is among the most common non-substance addictions, and its consequences are pessimistic. Mobile phones are so enticing to teens that some of them rarely turn them off at night . Using a smartphone in a compulsive manner can interfere with daily functioning. Nursing students are the most likely to own a smartphone and use it the most. **(Viola,2021).**

The symptoms of loneliness, boredom, anxiety, depression, stress, or lack of life satisfaction may be relieved online for smartphone addicts with dysphonic moods. Excessive smartphone use may result in impulse control disorders, pathological gambling, decreased real-life social interaction, and decreased academic ability. Depression, anxiety, and poor mental health are associated with excessive Internet use. Smartphone overuse negatively impacts daily life .(**Andrew,2020).**

Smartphone addiction is an inevitable aspect of technology due to its enhanced capabilities. Like other behavioral addictions, smartphone addiction is difficult to describe since it is impacted by social, psychological, and physical factors. Internet addiction and excessive smartphone use share many characteristics with behavioral addictions, such as "overuse to the point that it interferes with users' daily lives," even though smartphone addiction is not recognized as a separate diagnostic category.(**Kalaitzaki etal 2022).**

Overuse of cellphones impairs sleep quality, which affects students' capacity for learning, concentration, memory, and decision-making. Nursing To succeed academically, students need to get enough good sleep. Students frequently disregard their sleep schedules even though they are well aware of the importance of sleep and how it impacts their academic performance. Sleep quality has potential influence on physical strength and cognitive capabilities, the consequences of poor sleep quality and also have some serious problem such as depression, impaired work performance, and poor overall quality of life.**(Yang etal,2020).**

Students spend more time browsing social media and gaming apps on their smartphones, which results in excessive smartphone use, time spent on the device other than for studying, and low academic achievement. The nursing profession is the cornerstone of the health care system and nursing students are one of the upcoming healthcare providers whose own health wellbeing is essential to provide health services.(**Celikkalp etal, 2020).**

Due to their rigorous coursework and jobs, nursing students experience a great deal of stress, which can affect their work performance, morale, and level of happiness. Psychological effects like anxiety, irritation, hopelessness, melancholy, and trouble adjusting to daily life can result from excessive stress. Time management issues, a high workload, pressure to perform well on tests, family expectations, work-life balance issues, missing home, and financial concerns can all exacerbate stress, which lowers students' productivity and general well-being. **(Sebnem etal ,2023).**

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Significance of the study:

Smartphone use has evolved into an essential tool. There are 5.22 billion smartphone users worldwide, according to surveys. As of 2021, this represents 66.6% of the world's population. Additionally, during the COVID-19 pandemic, smartphone users rose by 1.8% between January 2020 and January 2021. An individual uses the internet for 6 hours and 54 minutes on average. According to 2020 figures, an individual uses their phone 160 times per day, or once every nine minutes..(**Ghogare,etal 2021).**

About 1.58 billion smartphones were sold in 2021, representing a 1.5% rise in yearly sales. Among university students, high smartphone ownership rates were observed, especially in Ghana (74%), Australia (81%), the UK (83%), the US (91%), and Saudi Arabia (94%–99%). Communication, information sharing, and online services are made easier by cellphones with internet connectivity and advanced mobile technology. One of the benefits of cellphones for medical professionals is that they offer convenient access to health information for education, health promotion, illness prevention, and management. Newly emerging negative features of mobile phone use pose risks to all populations in a variety of ways, including dependent, harmful, and forbidden uses.(**Augner etal,2023).**

This work gives a picture of smartphone and its effect on sleep quality and stress in student nurses who are a pillar of a successful healthcare system.

Aim:

This study aimed to determine the effect of smart phone addiction on stress and sleep quality of nursing students through the following Objectives:

1) Determine the prevalence of smart phone addiction among nursing students.
2) Examine the correlation between the smart phone addiction and sleep quality among nursing students.
3) Examine the correlation between the smart phone addiction and stress among nursing students.

Research Questions:

1) What is the prevalence of smart phone addiction among nursing students?
2) 2- what is the correlation between the smart phone addiction and sleep quality among nursing students?
3) What is the correlation between the smart phone addiction and stress among nursing students**?**

Subjects and methods:

Design: A descriptive exploratory design.

Setting: In the faculty of nursing, Helwan University Cairo, Egypt.

Subjects: A convenient sample of (150) nursing students from different academic years joined to summer courses of the academic year 2023-2024.

Data collection tools: four tools were implemented to collect data include: I: students personal data, II: smart phone addiction scale (SAS-SV) to evaluate addiction of smartphone, III: PSQI to identify the sleeping quality and IV: DASS -21 scale to determine the depression, anxiety and stress.

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The first tool: Students personal characteristics and behavior related to smartphone: The first questionnaire collected the students' personal characteristics and behavioral data, including age (years), gender, study year (1st, 2nd, 3rd and 4th year), duration of daily smartphone use in hours, smoking and health problems related to smarphone use.

The second tool: **Smart Phone Addiction scale(SAS-SV)**Subjects were asked to rate their agreement and disagreement. SAS-SVis an effective validated scale with10 items focusing on smartphone usage in the SAS survey. A 6-point Likert scale is used in the SAS survey (1-strongly disagree, 2-disagree, 3-weakly disagree, 4-weakly agree, 5-agree, 6-strongly agree). The score range is 10-30; a higher score was labeled as addicted**.(Kwon etal, 2013).**

The third tool: *Pittsburgh Sleep Quality Index (PSQI)*:It is a self-rated, standardized questionnaire that evaluates sleep disruptions and quality over a period of one month. Both quantitative measures of sleep quality, such length, latency, or number of arousals, and more subjective measures, like depth or restfulness of sleep, are included. Nineteen self-rated questions from the PSQI constitute part of the scoring system. Seven component scores are created by combining the 19 self-rated items. Sleep quality, sleep delay, effective length, sleep efficacy, sleep problems, number of necessary sleep-inducing drugs, and daytime performance are the seven items that make up the index's score. The total score ranges from 0 to 21, with each item having a score between 0 and 3 (0 denoting no difficulty and 3 denoting extreme difficulty). PQSI's dependability is 0.726**,(Buysse etal, 1989).**

The fourth tool: The depression, anxiety and stress scale (DASS-21). It is a self-reported scale made up of a set of three four-point Likert-typesubscales that assess symptoms of depression, anxiety and stress. Each subscale is made up of seven items divided into three factors (Items Depression: 3, 5, 10,13, 16, 17, 21; Anxiety: 2, 4, 7, 9, 15, 19, 20; Stress: 1, 6, 8, 11, 12, 14, 18). Each item has severity responses organized from zero (not applied at all) to three (applied a lot, or most of the time). The final score and the cutoff, which ranges from 0 to 42 for the interpretation, are determined by adding the responses to the items in each of the three sub-scales. These answers must then be multiplied by two. Normal, mild, moderate, severe, and extremely severe were the categories used to describe the degrees of stress and depression experienced. Scores 0–9 were regarded as typical for depression, 10–13 as mild, 14–20 as moderate, 21–27 as severe, and more than 28 as very serious. Stress ratings were categorized as follows: mild (15–18), moderate (19–25), severe (26–33), and very severe (>34).22 The emotional states were evaluated in the third portion using items from the DASS-21. The depression subscale's Cronbach's alpha was 0.92, stress's was 0.90, and anxiety's was 0.86. **(Vignola& Tucci, 2013).**

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Operational Design:

It included preparatory phase, validity of the modified tool and reliability, pilot study and field work.

A-Preparatory Phase:

It comprised rereading present and previous obtainable literature and knowledge using articles, internet, periodicals, and magazines to develop the data collection tools.

B-Validity& reliability:

Validity:

Five academic experts in adult nursing (medical surgical nursing) from the Faculty of Nursing were given the instruments to test their validity. Experts were asked to rate their agreement or disagreement with the face validity of the instruments in order to assess their relevance, clarity, completeness, and comprehensiveness. After reviewing their feedback, a final questionnaire was created and used.

Reliability:

Ten percent of the patients completed the standard questionnaire to gauge the instruments' dependability, and the results were consistent when the same sample was retested four weeks later.

C-Pilot Study:

To assess the effectiveness, dependability, clarity, and applicability of the tools, pilot research was conducted with 15 students, representing 10% of the sample size. The tools were then modified in accordance with the findings of the pilot study. Pilot study participants were not removed from the whole sample because no changes were made to the research's instruments.

D-Field work:

After obtaining the official approval establish the study. The researchers were introduced themselves to the students and explained the purpose of the research. The written consent was obtained from the candidates. The data collection covered a period of three months from beginning of August 2024and to the end of October 2024 in the previously mentioned setting. Data were collected through interviewing students to fill data collection tools. The study tools were completed and filled in by the students within an average time of 40-60 minutes as following: personal characteristics of students took about 15-20 minutes as well smart phone addiction scale(SAS-SV), it took about 10-15 minutes and *Pittsburgh Sleep Quality Index (PSQI)* took about 5-10 minutes and The depression, anxiety and stress scale (DASS-21) took about 10-15 minutes.

Administrative Design

This study was established after obtaining permission from the ethics committee from "the Faculty of Nursing, Helwan University", after explanation of the study aim. An official letter obtained from the dean of the same faculty. The study was approved by the ethical committee of Faculty of Nursing, Helwan University by (N0.42) by date 13-7-2024.

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Ethical considerations:

The following were included in the study's ethical considerations::

- The researchers gave the subjects who consented to participate an explanation of the study's purpose and goal.
- The subjects were informed they have freedom to decline participation in the study at any moment and their ability to withdraw from it at any time.
- The data was collected solely for research purposes, and following data processing, it was burnt.

Statistical analysis:

All analyses of the data were done using SPSS. Normality of the data was tested before any calculation. Continuous variables were normally distribute and expressed in mean ±standard deviation (SD), while categorical ones were represented in number and proportions. The chi-square test was applied for comparison of categorical variables. Statistical significance was considered at $p<0.05$.

Results

Table(1):Personal Characteristics of the studied students(n=150

Personal Characteristics	No.	%
Age(years)		
17	21	14.0
18	32	21.3
19	54	**36.0**
>19	43	28.7
Gender		
Male	78	**52**
Female	72	48
Marital status		
Single	120	**80.0**
Married	20	13.3
Divorced	10	6.7
Academic year		
First year	22	14.7
Second year	53	35.3
Third year	55	**36.7**
Fourth year	20	13.3
Smoking		
Yes	78	**52.0**
No	72	48.0

Table (1) displays that 36% of the students were 19 years old and 52% of them were males while 80% were single and 36.7% were in the third year. Finally 52% of them were smokers.

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Table (2):Smartphone usage of the studied students(n=150)

Smartphone usage	No.	%
Daily smartphone use		
0-2hr	23	15.3
3-5hr	28	18.7
6-8hr	45	30.0
9 hours and above	54	**36.0**
Number of phone checks/ day		
less than 10 times	31	20.7
10-20 times	61	**40.7**
21- 30 times	39	26.0
31- 40 times	19	12.7

Table (2) reveals that 36% of the studied students use smartphones 9 hours and above daily and 40.7% check phone 10-20 times daily.

Table(3): Smartphone behaviors of the studied students(n=150)

Smartphone behaviors	yes		No	
	No.	%	No	%
Thinking smartphone addict	84	**56.0**	66	44.0
Easily make friends	60	40.0	90	60.0
Feeling lonely	82	**54.7**	68	45.3
Having a friend to share her/his problems	57	38.0	93	62.0
Smartphone affecting friendships negatively.	64	42.7	86	**57.3**
Health problems related to phone use(headache, sleeplessness, eye problems)	109	**72.7**	41	27.3

Table (3) reveals that 72.7% of the studied students had health problems related to phone use and 56% think they are smartphone addicts, while 54.7% feeling lonely. Also 57.3% of the studied students think that Smartphone affecting friendships negatively.

Table(4):Smartphone addiction and stress levels of studied students(n=150)

Scores	Mild		Moderate		Severe	
	No	%	No	%	No	%
Smartphone addiction levels	5	3.3	98	**65.3**	47	31.3
Stress levels	109	**72.7**	20	13.3	21	**14.0**

Table (4) illustrates that 65.3% of the studied students had moderate smartphone addiction while 31.3% had severe addiction level. It also shows that 72.7% of the studied students had mild stress level while 14% had severe stress level.

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Table (5): Sleep quality levels of studied students(n=150)

Sleep quality levels	No.	%
Good	0	0.0
Moderate	48	**32.0**
Poor	102	**68.0**

Table (5)displays that 68% of the studied students had poor sleep quality level while 32% had moderate level.

Table (6):Sleep quality dimensions of studied students

Sleep quality dimensions	Mean(maximum score=3)	sd	Mean percent
Subjective sleep quality	1.76	0.72	58.67
Sleep latency	2.25	0.44	**75.00**
Sleep duration	2.28	0.67	**76.00**
Sleep efficiency	2.10	0.39	**70.00**
Sleep disturbance	1.97	0.52	**65.67**
Use of sleep medication	1.93	0.68	64.33
Daytime dysfunction	1.99	0.68	**66.33**

Table (6) reveals that the severity of the sleep duration dimension for the studied students was 76% which is the dimension with the highest severity, followed by sleep latency 75% then sleep efficiency 70% while the severity of the daytime dysfunction dimension was 66.3% and the sleep disturbance 65.6%.

Table(7):Correlation between phone addiction, stress and sleep quality

Scores	Addiction		stress		sleep quality	
	r	p	r	p	r	p
Smartphone addiction	1	-	0.37	0.00*	-0.25	0.002*
Stress	0.37	0.00*	1	-	0.71	0.00*
Sleep quality	-0.25	0.002*	-0.71	0.00*	1	-

*significant at p-value<0.05

Table (7) reveals that there is astatistically significant direct correlation between smart phone addiction and stress while there is a statistically significant inverse negative correlation between smart phone addiction and sleep quality. Also there is a significant inverse negative correlation between stress and sleep quality.

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Table (8): Linear regression analysis for impact of smartphone addiction on stress and sleep quality.

Dependent variable	Regression coefficient	S.E	t	p
Stress	0.52	0.10	4.85	0.00*
Sleep quality	-0.35	0.11	-3.1	0.00*

*significant at p-value<0.05

Table (8) displays that there is a considerable direct effect of smart phone addiction on stress. It also illustrates that there is a significant inverse negative effect of smart phone addiction on sleep quality.

Table (9): Correlation between Personal characteristics of studied students and study variables

Personal characteristics	Smartphone addiction		Stress		Sleep quality	
	r	p	r	p	r	p
Age(years)	-0.29	0.00*	0.37	0.00*	-0.40	0.00*
Academic year	-0.26	0.001*	0.61	0.00*	-0.89	0.00*
Smoking	0.08	0.29	0.05	0.5	-0.25	0.001*
	t	p	t	p	t	p
Gender	1.5	0.12	7.1	0.00*	1.8	0.06

*significant at p-value<0.05

Table (9) represents a significant inverse negative correlation between smart phone addiction and both age and academic year while there is a statistical direct correlation between stress and age and academic year.Also there was a considerable inverse negative correlation between sleep quality and both age and academic year and smoking while there was a potential difference between males and females according to stress. Females had higher levels of stress than males.

Discussion

Everyday activities and habits have drastically changed as a result of smartphones. Applications facilitate social interaction, email access, playing games, managing schedules, and enjoying music, videos, and movies. Smartphones may be useful for broadening perspectives, encouraging safety, reducing stress, preserving connections, and locating pertinent information, all of which have made them indispensable. However, improper smartphone use leads users towards unintentional time-wasting, and immoderate use carries the risk of smartphone addiction with an impact on physical and mental health.(**Heng Yue,2023).**

The results of the current study revealed that,more than one third of the students were in age 19 years while more than one quarter of them were more than 19 years ,more than half of them were males, the majority of them not married, more than one

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third of them were in the third year while about one third were in the second year. In relation to smartphone usage time, more than one third of the students use the phone 9hours and more and less than one third of them use it from 6-8 hours daily. In relation to smoking, more than half of the studied students were smoking. As regards number of phone checks daily, two fifth of the students check the phone 10-20 times daily while more than one quarter check it 21-30 times per day.

Park and Choi (2022) contradicted this results as mentioned in their study. The gender distribution was 47.2% male and 52.8% female. Age-wise, 13.6% of respondents were 25 years of age or older, while 86.4% were under 25. In college, 12.0% were in their first year, 16.8% were in their second, 52.0% were in their third, and 19.2% were in their fourth year.

The results of this work also disagreed with (**Chandio,et al 2023**) who mentioned that the participants‘ age range was18-24. The group's average age was20-24 with a standard deviation of 1.34. Out of all the participants, 85 were female (52.47% of the group), while the remaining 77 were male (47.53%). Of the 55 participants, the majority were third-year students in terms of academic year distribution. However, the smallest group was made up of fourth-year students.

As regards the number of hours using smartphones, (**Chandio,et al 2023**) also disagree with the present study, they demonstrated that over half of the participants spent less than six hours a day on their smartphones. This result was in line with the Turkish Statistical Institute's (TUIK) 2019 report showing 78.8% of smartphone usage was for less than six hours.

This work revealed , more than half of the subjects thinks that the use of smartphone is addiction and more than half also feeling lonely and think that smartphone affecting friendship negatively. less than three quarters of them had health problems related to phone use .

The research illustrated that more than two thirds of the students had moderate smartphone addiction while less than one third had severe addiction level. The study also displayed that less than two quarters of the students had mild stress level while minority of them had severe stress level.In relation to sleep quality, More than two thirds of the participants had poor sleep quality level while about one third had moderate level.

Chiara et al (2023),found that in South Korea, smartphone addiction was linked with poor sleep quality in university students. They discovered that high mobile phone addiction was correlated with poor sleep quality. The study reported that higher levels of smartphone addiction and stress were associated with lower sleep quality . In addition, **Kwon et al.(2022),** also reported that attention-deficit hyperactivity disorder (ADHD) symptoms were positively correlated with smartphone addiction ($p < 0.01$) and poor sleep quality($p < 0.01$) .

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This work revealed that the severity of the sleep duration dimension for the studied students was more than three quarters which is the dimension with the highest severity, followed by sleep latency three quarters then sleep efficiency less than three quarters while the severity of the daytime dysfunction dimension was two thirds and the sleep disturbance less than two thirds.

This findings agreed with**(Sung&Young,2015)** who supported that there was a strong correlation between smartphone use and sleep quality; the more smartphones were used, the worse the sleep quality (r =.30, p =.000). Similarly, there was a significant link between stress and sleep quality, with higher stress levels resulting in lower sleep quality (r =.44, p =.000), especially for daytime dysfunction (r =.44, p =.000).

(Algburi&Yassin,(2024) stated that, there is a statistically considerable association between smartphone addiction and depression (p=0.0001) and anxiety (p=0.008). While 21 students (51.2%) report mild depression linked to smartphone addiction, 63.2% of students suffer from severe-very severe depression. Additionally, 58 students (48.7%) experience moderate anxiety related to smartphone addiction, whereas 41 students (58.6%) have severe anxiety. Nursing students experienced high levels of anxiety in relation to the anxiety brought on by using cell phones.

This finding is in line with that by(**Mohamed and Mostafa, 2020**). Who found that students are more likely to use smartphones and experience anxiety? This study found that nursing students have significant levels of mobile phone addiction. People who are caught in a vicious cycle could be the cause of this result. Up to 85.4% of the kids had a high index of smartphone addiction, according to the survey.

The current study shows that there is a substantial direct correlation between smart phone addiction and stress while there is a considerable inverse negative correlation between smart phone addiction and sleep quality. Also there is a potential inverse negative correlation between stress and sleep quality and there is a marked direct effect of smart phone addiction on stress. There is a significant inverse negative impact of smart phone addiction on sleep quality.

The study also illustrated that, there is a statistically considerable inverse negative correlation between smart phone addiction and both age and academic year while there is a considerable direct correlation between stress and age and academic year. Also there was a statistical inverse negative correlation between sleep quality and both age and academic year and smoking while there was a significant difference between males and females according to stress. Females had higher levels of stress than males.

The study findings was in the same line with **(Algburi&Yassin,(2024)** who reported that according to the SAS, 96 (51.1%) of medical students have a significant smartphone addiction, compared to 77 (39.5%) of non-medical students. Students under age of 20 have a significantly higher addiction rate than older students (p=0.011), and

ISSN 2786-0183

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those in academic year (1-3) are potentially addicted to smartphones (p=0.048). It was found that daily smartphone use for more than five hours was statistically associated with smartphone addiction (p=0.0001). In this study, smoking was statistically significantly associated with smartphone addiction (p=0.039). Gender, marital status, place of residence, and living arrangement do not statistically significantly correlate, which runs counter to the results of the current study.

Finally, since prevention is always preferable to treatment, it is advised that nursing students who are addicted to smartphones be detected early so that suitable interventions can be planned. The results of this study will also serve as a baseline for future research.

Conclusion:

According to the study, nursing students' mental health is significantly impacted by their use of smartphones. The negative effects were sleep disturbance, loneliness, and anxiety. The study found that nursing students were becoming more and more dependent on their phones, which prompted psychological considerations.

Recommendations:

In the light of the current findings, the following recommendations are proposed to students

1- Establishing effective counseling programmes to avoid smartphone addiction of nursing student by the identification of addiction level and relationship of addiction with depression and anxiety.
2- Encourage the students to take up a hobby or learn something new
3- Raise the awareness of nursing students about the biopsychosocial harms of smartphone addiction **.**
4- Further prospective studies are required to accurately evaluate each proposed association for smartphone addicted students.

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Helwan International Journal for Nursing Research and Practice

Vol. 4, Issue 11, Month: September 2025, Available at: https://hijnrp.journals.ekb.eg/

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